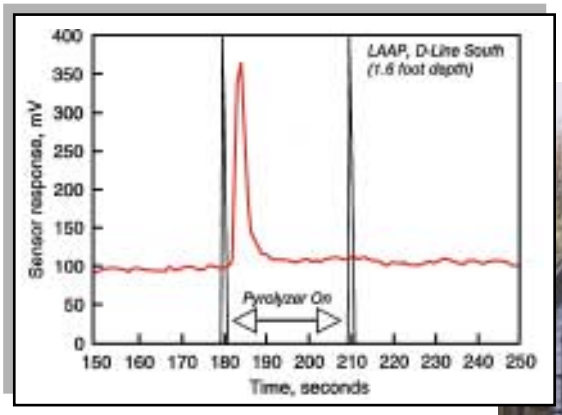
Tri-Service SCAPS Explosives Sensor

Detecting and Mapping Subsurface Explosives Contamination



The Tri-Service SCAPS Explosives Sensor offers fast, inexpensive, detailed characterization of explosives contaminated sites.

Traditional methods of site characterization are costly and time consuming. Using the Explosives Sensor, deployed by the Tri-Service Site Characterization and Analysis Penetrometer System (SCAPS), will result in reduced cost and time to characterize and remediate sites contaminated with explosives. SCAPS and its associated sensors provide the DoD, DOE, EPA, and the private sector with a cost-effective means to rapidly characterize subsurface conditions at contaminated sites through real time, on-site data acquisition and processing.

USAEC Environmental Technology Division

USAEC - ETD • Aberdeen Proving Ground, • Maryland 21010-5401 1-800-USA-3845
t2hotline@aec.apgea.army.mil

Delineating Subsurface Explosives Contamination

The Tri-Service SCAPS Explosives Sensor detects explosives contamination in the subsurface soil. The Explosives Sensor is based on electrochemical sensors that detect the presence of certain chemical compounds characteristic of explosives.

The SCAPS Explosives Sensor probe incorporates geophysical sensors (tip resistance and sleeve friction sensors) for determining soil classifications/layering. The probe collects soil classification versus depth and contaminant versus depth information during the penetrometer push.

The probe incorporates an external pyrolyzer system which is used to transform explosive compounds into electroactive vapors. A pneumatic system transports these vapors from the soil to the electrochemical sensors inside the probe.

Various other materials present in soil may contain some of the same compounds characteristic of explosives. Therefore, the Explosives Sensor is equipped with electrochemical sensors to differentiate between compounds containing organic nitrogen and inorganic nitrogen. These sensors distinguish explosives compounds from others, such as common fertilizers.

In order to ensure there is no conduit for cross-contamination, grout is used to seal the penetration hole upon completion of a push. The grout, a mixture of cement, bentonite, and water, is pumped through an internal tube in the cone penetrometer, ejecting the cone tip and filling the hole as the push rods are retracted.

The combination of the SCAPS Explosives Sensor with other SCAPS capabilities, such as subsurface mapping of soil layering, or stratigraphy, and contamination, allows for rapid, less expensive site characterization, continued monitoring, and remediation activities.

Application of innovative SCAPS field screening technologies, such as the Explosives Sensor, results in faster, more detailed site characterization at significantly reduced costs compared to traditional methods.

Solutions

For more information on USAEC-ETD technology programs please call the:

Army Environmental Hotline
1-800-USA-3845 or email:
t2hotline@aec.apgea.army.mil